**Stat and Data Analysis**

**CW 3.1 – Z-Scores and Percentiles NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. The water capacities (in gallons) of the 61 major solid-fuel boilers sold in the U.S. are given below. The data are also in list BOIL.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6.3 | 7.4 | 8.6 | 10 | 12.1 | 50 | 8.2 | 9.8 | 11.4 | 12.9 | 14.5 | 16.1 | 26 | 21 | 27 | 12 |
| 40 | 55 | 30 | 35 | 55 | 65 | 18.8 | 23.3 | 28.3 | 33.8 | 26.4 | 33 | 50 | 35 | 21 |  |
| 21 | 18.5 | 26.4 | 37 | 12 | 12 | 50 | 65 | 65 | 56 | 66 | 60 | 70 | 27.7 | 34.3 |  |
| 42 | 46.2 | 33 | 25 | 29 | 40 | 19 | 9 | 12.5 | 15.8 | 24.5 | 16.5 | 29 | 50 | 65 |  |

1. Look at a graph of the data (do not need to sketch it below). Which numerical summary (which measure of center & spread) would be better to describe the distribution of boilers? Why?
2. Find the summary statistics. Write them below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| mean | st. dev. | n | min | Q1 | med | Q3 | max | IQR |
|  |  |  |  |  |  |  |  |  |

1. Describe the position of the *Passat HO-45*, which has a capacity of 46.2 gallons by finding and then interpreting each of these values:
2. Percentile
3. Z-score:
4. Would an observation of 30 gallons be considered an extreme observation? Calculate its Z-score and use this to explain why.
5. Would an observation of 95 gallons be considered an extreme observation? Calculate its Z-score and use this to explain why.
6. Using the data above, sort the list (from least to greatest) and then change the largest capacity (the largest number in your list) to 500 gallons. Recalculate the statistics below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| mean | st. dev. | n | min | Q1 | med | Q3 | max | IQR |
|  |  |  |  |  |  |  |  |  |

1. What would be the *z*-score corresponding to a boiler that is 500 gallons? Use the mean and std. deviation that you calculated in letter (f).
2. Which of the statistics that you calculated in letter (f) are ***resistant***? Explain.
3. Suppose the average (mean) price of gas in a large city is $1.80 per gallon with a standard deviation of $0.05.
4. Convert $1.90 and $1.65 to *z*-scores.
5. Convert the following *z*-scores back into actual values: 1.80 and –1.60.
6. Suppose the attendance at a movie theater averages 780 with a standard deviation of 40.
7. An attendance of 835 equals a *z*-score of:
8. A *z*-score of –2.15 corresponds to an attendance of: